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MARCH 12, 1949

SCIENCE NEWS LETTER

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MAR 16 1949

THE WEEKLY SUMMARY OF CURRENT SCIENCE



President Greets Winners

See Page 165

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VOL. 55 NO. 1



“Talking” pegs... and Talking people

THERE ARE 10,000 pegs in this machine, representing 10,000 subscribers in a crossbar telephone exchange—the latest switching system which handles dial calls with split-second swiftness.

The pegs represent many types of telephone users—two-minute talkers and ten-minute talkers . . . people who dial accurately . . . those who make a false start or two. They are starting a journey through a unique machine which analyzes the performance of dial equipment in a typical central office.

But while an actual crossbar exchange connects your call in a matter of seconds, this counterpart moves far more slowly. It gives the Bell Laboratories engineers who built it time to observe what happens to

each call—where bottlenecks develop, which parts are overworked or underworked, which of the circuits are most used.

In a manual exchange, the number of operators may be changed to meet different traffic conditions. In crossbar, all switching is done by complex electro-mechanical devices, permanently built in. This machine shows how many devices of each kind there must be in a new exchange to give you the best of service with a minimum of expensive equipment.

This traffic-study machine is one of the many ingenious research tools devised by the Laboratories as part of its continuing job—finding new ways to give you better and better telephone service.



BELL TELEPHONE LABORATORIES

Exploring and Inventing, Devising and Perfecting, for Continued Improvements and Economies in Telephone Service

MEDICINE

Rate Pain in Childbirth

A new method, called dolorimetry, measures painfulness by comparing the spontaneous pain with that induced on the person's skin by heat rays.

► HOW painless is the so-called "natural" method of childbirth? Is the woman who screams, groans and cries having more real pain than the one who sweats out her labor in comparative silence? Do the pains actually become more intense as labor goes on, or does the mother feel worse because she is getting tired, anxious and sometimes angry or hostile?

Answers to these and other questions on childbirth pain and methods for relieving it are coming from a new technic developed by Dr. James D. Hardy and associates of the Russell Sage Institute of Pathology, the New York Hospital and Cornell University Medical College.

First a laboratory method of measuring painfulness, called dolorimetry, was worked out. Now Dr. Hardy with Dr. Carl T. Javert has applied it to the study of childbirth pain in 13 normal young women. This is the first application of the method to clinical problems, such as pain in childbirth or pain in various diseases.

The method of measuring painfulness, dolorimetry, consists essentially in comparing the intensity of a spontaneous pain, such as labor pain, with that induced on the person's skin by heat rays. The painfulness is measured in units called "dols." Both words, dolorimetry and a dol, come from the Latin word for pain, dolor.

The top of the dol scale is reached at about 10 and one-half dols. At this point increasing the intensity of the heat rays can cause no further increase in pain that a person can perceive, or notice. One dol is about one-tenth of this maximal pain intensity.

The heat that produces nine dols of pain may be great enough to cause second degree burns. The bottom of the scale is the amount of heat stimulus that causes a just perceptible "prick."

In the studies of the 13 women in labor, the heat stimulus was given to the back of the hand for three seconds immediately following a contraction, or labor pain. The woman then reported whether the pain on her hand was more or less intense than that of the uterine contraction. If it was more intense, the heat stimulus was decreased and another test made. If the first heat stimulus pain was less intense than the labor pain, the heat stimulus was increased for a second test. By this bracketing method, it was possible to find quickly the stimulus which was of about the same intensity as the labor pain, or contraction.

During the first quarter of the first stage of labor the few measurements made showed the pains to be of mild intensity averaging

not more than two dols. In the second quarter of the first stage the pain was moderate, averaging between three and five dols. During the third quarter the pain averaged between five and seven dols. This, the doctors state, is "a severe pain." At this point most patients asked for relief. Whenever the patient asked for something to relieve the pain it was given to her and the pain studies were stopped.

In the last quarter of the first stage, pain was between seven and 10 dols.

The second stage of labor was characterized by the most severe pains, 10 and one-half dols accompanying the "bearing down." After delivery the pains in the fourth stage were again of mild intensity. Measurements were made on two patients in the second stage and two in the fourth. None were made in the third stage during which the baby was delivered.

The findings in the study bear out the impressions doctors have had regarding the psychological factors affecting the behavior of patients in labor, Drs. Hardy and Javert state in their report to the *JOURNAL OF CLINICAL INVESTIGATION*. (Jan.)

One patient cried and complained with vigor from the start, though her pain measurements indicated only two to four dols. Another patient gave little evidence of her pain. But she had had children before and her labor was short. This may have accounted for her restraint in the face of pains measured at eight to 10 dols. She showed less signs of pain at eight dols than other patients with longer labors at four dols.

The 13 women in the study volunteered readily, either out of curiosity or because of a desire to be of service. All of them were ready to stand any reasonable discomfort if it would help ease the suffering of future patients. Of the 13, nine were private patients with a definite interest in the investigation because they were former nurses or wives of physicians or professional men.

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AERONAUTICS

B-50 Bomber Is Flown Non-Stop Around World

► "LUCKY Lady II," the Air Force B-50 bomber which was flown non-stop around the world in 94 hours, might have gone around more than eight times, if it had merely equalled the endurance record for non-stop flight.

The endurance record was set in 1935 by Fred and Al Key, in a much less imposing craft than the new B-50. Instead of going around the world, the Key brothers set



AROUND THE WORLD IN 94 HOURS—"Lucky Lady II", the Boeing B-50 (lower) is shown being refueled in flight by the B-29 during training mission over Arizona prior to the round-the-world non-stop flight which ended March 2 after 94 hours of continuous flying.

their record flying over Meridian, Miss. They took off on June 1, 1935, and landed July 4.

This 34-day flight was not a scientific or military test. It was a stunt, tops among such endurance flights made at the time.

Secrecy cost the "Lucky Lady II" a formal world record on its non-stop flight.

The flight is not a record, formally in the more or less official eyes of the world governing body for sporting aviation, the Federation Aeronautique Internationale. The first non-stop round-world flight did not meet the rules set up for globe-circling flights.

C. S. Logdson, director of the contest division of the FAI's U. S. representative, the National Aeronautic Association, explained that he had tried. One of the few persons

outside of the Air Force who knew of the flight, Mr. Logdson some weeks ago asked Air Force officials to plan the venture according to the "Hoyle" of aviation, the FAI's rules.

This would have involved some changes in the route. It would also have required certified observers at several points to witness the flight. Air Force officials balked because it would have been letting too many people know about the planned flight, Mr. Logdson said.

The rules call for check-ins at New York, San Francisco, Karachi, (Pakistan) Tokyo and any one of London, Paris, Berlin or Rome.

But, Mr. Logdson admitted, no one ever has followed these rules, so there is no formal FAI record for circling the globe.

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MEDICINE

Isotopes Without Charge

► **RADIOACTIVE** varieties, or isotopes, of chemical elements, which can be used to help unlock some of the deadly secrets of cancer will go to qualified scientists without charge henceforth.

This policy for encouraging cancer research was announced by the U. S. Atomic Energy Commission. All but three of the more than 50 radioactive isotopes now available to scientists from the atomic furnace at Oak Ridge, Tenn., had previously been sold to scientists at prices based on production costs.

The new rule applies only to scientists doing three types of research, all related directly to investigation and treatment of cancer. These are: cancer experiments with animals; studies of basic cellular metabolism of cancer cells; and evaluations of therapeutic uses of radioactive isotopes. Scientists working in other fields will still have to pay the list prices for the isotopes.

Among the isotopes now being made

available without charge to cancer researchers is the promising variety of the element cobalt with an atomic weight of 60. Cobalt 60 is expected to be an effective substitute for rare and expensive radium in cancer treatment.

The Commission said that \$450,000 has been set aside to cover the cost of the new cancer-aid isotope program in its first year. Scientists who qualify for the free isotopes will pay a \$10 handling charge and shipping costs, but there will be no charge for the isotopes.

To be eligible, a researcher must be associated with an institution with facilities for radioactive research, must have the approval of local superiors and must be a physician experienced in radioactive research or working with experienced physicians to make clinical studies.

Chemical compounds with radioactive isotopes in them will be made up for cancer investigations, but scientists will be charged

for the additional cost of preparing the isotopes in compounds.

Other phases of the Atomic Energy Commission's cancer-fighting program include support of selected research projects, facilities at Commission installations for use of short-lived isotopes which cannot be shipped to laboratories at a distance and continuing investigation of cancer among survivors at Hiroshima and Nagasaki.

Distribution of isotopes is administered by the Commission's Isotopes Division at Oak Ridge.

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GENERAL SCIENCE

Science Talent Institute

President Truman promised the 40 honor-trip winners that when peace came to the world there would be an immense numbers of jobs in the field of science.

See Front Cover

➤ FORTY boy and girl winners, the year's top talented young scientists of America, attended the five-day Science Talent Institute in Washington (March 3-March 7) as the culminating event in the Science Talent Search for \$11,000 in Westinghouse Science Scholarships. This educational event is conducted by the Science Clubs of America, administered by Science Service.

Upon their arrival in Washington, the young scientists were welcomed at the White House by President Truman, as shown on the cover of this week's SCIENCE NEWS LETTER. He stated in part:

"There never was a time in the history of the world when we need scientists and people of energy as we need them now. There is more room at the top now than ever in the history of the world.

"Don't let anybody tell you that by effort and by hard work you can't reach the top of the profession, if you want to, because people who try to work and want to work are as scarce as the proverbial hen's teeth. Those people who want to work and are willing to shoulder responsibility will always find plenty of responsibility and plenty of work. I think I am in a position to say that better than most anybody.

"So just bear that in mind. And I want to congratulate all of you. I appreciate the privilege of getting a chance to see all of you, and I hope that you will go out of here with the idea of finishing the job and becoming an asset to this great United States of America.

"If at a later date the peace comes to the world and we proceed to implement the policies which we are trying to inaugurate, there will be an immense number of jobs—a greater number of jobs in your line—than there will be men and women available to fill them."

This issue of the SCIENCE NEWS LETTER contains some of the addresses made by leading scientists. Further activities of the Institute will be reported in the next issue when the scholarship winners will be announced.

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Pure Science Aids Progress

➤ "PURE science is the life blood of all industrial progress," an industrial research executive told the nation's top high school scientists.

Dr. John A. Hutchesson, director of the Westinghouse Research Laboratories, told the 40 winners of the Eighth Annual Science Talent Search that government and

university laboratories have no monopoly on pure research.

He said that huge sums are spent each year by industry in scientific research "quite without regard to immediate practical application."

He cited the construction of an atom smasher by Westinghouse before nuclear fission was demonstrated as an example of pure research which later "paid off." Westinghouse scientists later discovered the exact amount of energy required to split uranium atom.

"The fact is," declared Dr. Hutchesson, "that industrial progress would come to a complete standstill without pure research."

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Genetics Called Practical

➤ MENDELIAN genetics, the branch of science that has been suppressed in the USSR partly on the grounds of its alleged

impracticality, was declared of immense practical value by Dr. M. Demerec, geneticist of the Carnegie Institution of Washington. He spoke before the Science Talent Institute, attended by the 40 winners of the Eighth Annual Science Talent Search for the Westinghouse Science Scholarships.

"From the practical standpoint, genetics has made many important contributions to the improvement of domestic animals and plants," Dr. Demerec stated. "The most striking success has been accomplished in corn breeding, where the crop yield has been increased about 20% by the use of hybrid corn, developed through methods based on the theoretical work of G. H. Shull. In 1948 the value of this increased yield was around a billion dollars.

"Production of penicillin also has increased, five- to sevenfold, through the development of high yielding strains of *Penicillium* by genetical methods."

Genetics is also proving of great value in untangling knotty questions in other fields of biology. The speaker cited, as one example, the use of special strains of a fungus in studying how amino acids, the building-blocks of proteins, are put together by living organisms. This is a problem in physiology with eventual possibilities in such everyday practicalities as the production of bread, beans and beefsteaks.

Dr. Demerec reviewed the recent controversy among Russian biologists, which



OPERATION SKYHOOK—A high-altitude plastic balloon, as seen from the bridge of the USS Saipan, aircraft carrier, shown nearly ready for launching, reached an altitude exceeding 90,000 feet. This took place in the Caribbean area as part of a cosmic ray research project being carried out under the direction of the Office of Naval Research. The project gets its name from the 100-foot balloon, several of which were launched carrying cloud chambers.

ended in the triumph of Trofim Lysenko and the banning of teaching and research in Mendelian genetics in Soviet institutions by order of S. Kaftanov, Minister of Higher Education in the USSR. Until this intervention of the political power of the state to force conformity with his views, Lysenko's views were not taken seriously by informed biologists. Dr. Demerec pointed out. He characterized the experimental evidence offered by Lysenko in support of his anti-Mendelian claims as "weak and questionable."

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Radium Has Cost Few Lives

► THE equivalent of hundreds of tons of radium has been handled by the wartime Manhattan District and the U. S. Atomic Energy Commission with the loss of only two lives, compared with about 100 lives lost in refining only two and one-half pounds of radium up to 1941. These figures were disclosed to the 40 high school scientists by the director of the AEC's division of biology and medicine, Dr. Shields Warren of the Harvard Medical School.

He advised the science-minded high schoolers that the chief problem of modern medicine is degenerative diseases, such as cancer, hardening of the arteries, diabetes and arthritis.

"In general, little progress has been made in controlling them and insufficient progress in treating them," Dr. Warren said.

Today's young scientists are starting out with important new tools for tackling this and other problems, he pointed out, citing the development of atomic energy, use of radioactive tagging of elements and knowledge of the biological effects of radiation.

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Food-Population Problem

► SCIENTISTS of tomorrow fired questions at two scientists of today in an interview over one of the world's more pressing problems: whether world food production can be increased enough to meet the needs of the world's rapidly multiplying population.

The two scientists were Prof. Paul B. Sears, Oberlin College botanist and author of *DESERTS ON THE MARCH*, and William Vogt, chief of the conservation section of the Pan American Union and author of *ROAD TO SURVIVAL*. They faced a barrage of questions from winners in the Eighth Annual Science Talent Search, in Washington for final selection in the awarding of \$11,000 in Westinghouse Science Scholarships. Their interview was put on the air over stations of the Columbia Broadcasting System, as part of the *Adventures in Science* series, with Watson Davis, director of Science Service, participating.

Prof. Sears and Mr. Vogt agreed that the problem is exceedingly critical right now, with population apparently outstripping its means of support. Mr. Vogt pointed out that each day the world has some 55,000

more mouths to feed than it had on the day before, and added that if India's death rate is cut to the level of America's, the people of that one land "could populate five earths the same as ours within the next hundred years."

Admitting that the situation is serious, Prof. Sears declined to regard it as hopeless. People can change their ways, he declared, and it is possible to induce them to make changes in the right direction by proper appeals to their self-interest. As an example, he cited the way the American people have literally cleaned themselves up in the past couple of generations, in response to persistent propaganda for hygiene and sanitation, and equally persistent advertising for soap and bathroom fixtures. Similar campaigns, he held, could get us and other peoples to conserve our resources and use them wisely instead of wasting and ruining them.

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Lay Cultural Foundation

► LEADERSHIP in science demands a well-rounded education in non-scientific subjects as well as specialization in science, the 40 winners of the Eighth Annual Science Talent Search were told by top scholarship winner of the First Science Talent Search, Dr. Paul E. Teschan of the University of Illinois Hospitals in Chicago.

Since every young man and woman who looks toward a career in research science must expect to put in from two to five years of graduate training after receiving the bachelor's degree, there will be plenty of time for close specialization in one's chosen subject in the graduate or professional school, Dr. Teschan pointed out. The time to acquire mastery of the necessary non-scientific subjects is in the undergraduate years, for once graduate training has begun the schedule will usually be too tight to permit any such academic browsings.

The science student planning his course should begin, Dr. Teschan advised, by selecting the graduate school he expects to attend and learning its entrance requirements. He should then select an undergraduate college that will enable him to meet those requirements and at the same time give him the knowledge and thoughtways in non-scientific fields which he will need as a complete citizen. He suggested considering the small independent liberal arts college for undergraduate work because of the smaller classes and the closer contact between students and head professors possible in such places.

Dr. Teschan, who won top honors in the First Science Talent Search in 1942, attended Carleton College and the University of Minnesota, and received four degrees from the latter institution. He holds the rather unusual degree of Bachelor of Medicine as well as B.S., M.S. and M.D. degrees. He was married last September to a fellow-student in medicine, Miss Patricia Pendill of Washington, D. C. Mrs. Teschan is now completing her medical studies at the Uni-

versity of Illinois Medical School while her husband serves his internship.

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ARCHAEOLOGY

Ancient American Remains Found in Virginia Campsite

► DWELLING sites of some of the oldest of America's inhabitants have recently been found in two places in southern Virginia and northern North Carolina by archaeologists of the Smithsonian Institution. A report by Carl F. Miller of the River Basin Surveys describes them.

These early traces of habitation were left many centuries ago by Folsom Man—a tribe so ancient that by comparison the Lees and the Seviars seem comers on a recent immigrant ship. Folsom Man is known primarily from campsites unearthed in the West, yielding peculiarly chipped stone dart points and other artifacts. Similar remains have been found in the Virginia-Carolina campsites.

Of later date, Mr. Miller states, are other sites where weapons and other objects of peoples who came after the Eastern Folsom group. Even of these, some are from so far back that the occupants did not know the use of pottery. Finally, there are culture remains of more readily recognizable Indians, who used bows and arrows instead of the earlier hand-flung darts, and who had also invented pottery.

The finds were made during a survey of the reservoir area of the Buggs Island dam project, which listed 94 sites of human occupancy.

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BIOCHEMISTRY

England To Hold World Congress on Biochemistry

► THE world's first congress of biochemistry will be held this summer, Aug. 19 to 25, at Cambridge University, England. From many countries investigators in living processes of chemistry will report their latest findings and exchange information with workers in other laboratories.

Although the French *Société de Chimie Biologique* has organized in past years meetings which scientists of other lands have attended, no formal international meetings have been held previously.

The sessions of the new congress will be organized into 12 sections, covering the following fields: animal nutrition and general metabolism; microbiological chemistry; enzymes and tissue metabolism; proteins; clinical biochemistry; structure and synthesis of biologically important substances; cytochemistry; biological pigments, oxygen carriers and oxidizing catalysts; hormones and steroids; chemotherapy and immunochemistry; plant biochemistry; and industrial fermentations.

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BIOLOGY

Rats Youthful in Senility

Experimental giant rats have been produced with purified growth hormone. Scientists believe this shows that the body possesses no mechanism to block the hormone.

► A GROUP of animals, the like of which is strange to the earth, have been produced in the first series of experiments with the purified growth hormone at the University of California at Berkeley.

The rats never cease to grow during their lifetime, with the exception of a short period just at maturity. Senile in terms of age, they nevertheless died with giant bodies which possessed the characteristics of youth.

The animals' bodies were normally shaped, except for oddly small paws and bulging lower jaws, similar to the condition found in acromegaly. Their organs varied in size, some keeping pace with their body growth, others remaining normal, while still others were slightly reduced in size.

The odd giant rats were grown and analyzed by a team of scientists headed by Dr. Herbert M. Evans, director of the Institute of Experimental Biology, and Dr. Hermann Becks, professor of dental medicine.

From the time of the discovery of the growth hormone in 1921 by Dr. Evans and Dr. Joseph A. Long, a remarkable series of experiments have been conducted with this substance. Yet until the hormone became available in purified form recently, the impurities in the hormone used in earlier experiments made it impossible for scientists to be certain of precise effects of the hormone. In the recent experiments, the scientists can be certain of the hormone's effects.

In this research, the scientists used two groups of rats. One group was given no growth hormone. The other group, after reaching maturity and ceasing growth, at from 192 to 221 days of age, were given growth hormone until they were an average of 647 days old—extreme old age for a rat.

When the two groups of animals were sacrificed at this age, it was found that the injected animals weighed an average of 548 grams, an average gain of 293 grams, while the uninjected rats average 288 grams, representing an average gain of 59 grams. A gram is about one-thirtieth of an ounce.

During the early period of injection, the experimental animals grew at an enormous rate, and, while the rate of growth tapered off toward the end, these rats never ceased to grow.

One of the implications of this, the scientists state, is that there appears to be no antibody to the growth hormone; in other words, the body possesses no mechanism to block the continued effect of this substance.

Chemical analysis of tissues showed a high protein and water content with a de-

creased proportion of fat, a condition characteristic of youth. This was also a measure that true growth had taken place and not just a gain in fat.

Liver, stomach, intestine, kidney and heart increased markedly, maintaining the same proportionate size as the bodies. The reproductive organs decreased slightly in size, while the pituitaries and adrenals underwent just a slight increase in weight.

The animals had larger skulls, pelvis, vertebral column, tail, bones and chests. Small size of the paws was an indication that the growth centers had closed early in life.

Chemical studies showed that the giant rats excreted less nitrogen, which is a critical factor in amino acids, the building blocks of proteins. From this it was concluded that the mechanism of the growth hormone is to promote protein synthesis.

Colleagues of Drs. Evans and Becks in the research were Drs. Leslie L. Bennett, Alexei Koneff, Choh Hao Li, Miriam Simpson, C. Willett Asling and Daniel Collins.

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ARCHAEOLOGY

UNESCO Scientists Advise On Saving Indian Murals

► ANCIENT wall paintings discovered at Tanjore, South India, will be preserved if an emergency call for technical information issued by UNESCO is heeded and methods are discovered for separating two layers of frescos painted over 500 years apart.

Archaeologists in India are attempting to preserve and restore the superimposed layers of murals. Dr. B. B. Lal, archaeological chemist in Dehra Dun, appealed to the UNESCO field science cooperation office in New Delhi for suggestions from the world's archaeologists who had undertaken similar work.

The lower paintings were executed in the 10th to 11th centuries on a well-prepared base of lime plaster placed on a solid wall of granite blocks. Then in the 16th or 17th century another layer of lime plaster, also about a quarter to a half inch thick, was placed on top and similar paintings also in tempera or fresco-secco were placed on this layer.

The Indian archaeologists now want to remove the top layer of paintings and their base and mount them elsewhere, leaving the original decorations in place unharmed on the wall.

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RAINDROP BEHAVIOR—A single large water drop is seen here undergoing shock breakup in experiments simulating raindrop behavior conducted by weather scientists at General Electric Research Laboratory.

METEOROLOGY

Falling Raindrops Not Streamlined, Study Shows

► FALLING raindrops do not have the sleek, "teardrop" outline they are commonly supposed to possess, it has been demonstrated by Duncan C. Blanchard at the General Electric Company research laboratories. Instead, large drops pass rapidly through dozens of shapes—jelly beans, dumbbells, telephone sets, caterpillars, old shoes. Smaller drops are more conservative; they are usually either spherical or football-shaped.

Mr. Blanchard made his investigations with the aid of a machine that has been named the "drop controller", which simulates the conditions of a long fall by blowing a current of air upward against the drops, making a fall of a few inches equivalent to one of hundreds of feet in still air. During this nearly stationary fall the writhing drops changed shapes as often as 50 times a second, with every stage recorded by an ultra-high-speed stroboscopic flash camera.

One interesting raindrop phase might have been termed a miniature flying saucer, for the drops not only flattened into disks, but the disks spun dizzily as they fell.

Mr. Blanchard's investigation was carried on as a part of Project Cirrus, joint cloud study program of the Army Signal Corps and the Office of Naval Research. The work in the General Electric laboratories in Schenectady, N. Y., was done under the supervision of Dr. Irving Langmuir, associate director.

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RADIO

Radio Frequency Standards Now Available World-Wide

► NATIONAL Bureau of Standards radio broadcasts of continuous standard frequency and time signals on five, ten and 15 megacycles will be audible all over the world, it is expected, with a supplemental experimental station just opened on the island of Maui, Hawaii.

The new station operates under the call letters WWVH. It has been established specifically to determine if the basic technical broadcasts of the Bureau's station WWV at Beltsville, Md., can be extended to localities in the Pacific not reached by WWV.

Standard frequencies are necessary in radio and radar communications, electronics, acoustics, and other fields. Radio frequencies are inclined to "drift," but the Bureau's basic signals are accurate and any desired frequency may be precisely measured by reference to the standards broadcast. Standard frequencies, for example, enable radio stations to keep within their assigned frequency channels, and to avoid interference with each other.

The accuracy of each of the Bureau's transmitted frequencies and time intervals of one minute or longer is better than one part in 50,000,000. Basic component of all the broadcasts is a quartz crystal oscillator which vibrates at a frequency of 100,000 cycles per second.

One purpose of this Hawaii experimental program is to determine whether simultaneous operation of two standard frequency stations can be achieved without mutual interference or degradation, and without a complicated schedule of operation. For this reason, the Bureau desires reports by users of WWV who now experience interference from the new station. Other information desired is evidence of any beat frequency, and whether the operation of WWVH does or does not improve standard frequency reception at any given place.

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ECOLOGY

Life in 50 Caves Studied By High School Explorer

► CAVE exploration meant adventure and treasure-hunting to boys of the Tom Sawyer-Huckleberry Finn era, but to modern youth it has come to mean a scientific search for fascinating facts. This is well exemplified in the case of 17-year-old Thomas C. Barr, Jr., senior at Hillsboro High School in Nashville, Tenn. He has spent most of his holidays and other spare time for the past two years investigating the animals and plants of the dark worlds represented in some 50 caves in Tennessee, Kentucky and New York.

All told, he has found about 40 animal species in the caves. They range all the way

from occasional transient lodgers, like opossums and racoons, to regular tenants like hibernating bats, and on to the blind fish, salamanders and insects of the perpetually dark inner caves.

Plant life in caves is far less abundant and varied than the animal life, Mr. Barr states. This is of course to be expected, considering the dependence of all freeliving higher plants on light. Green plants are found only in the twilight zone near the cave entrances. These include mainly such forms as tolerate or even prefer dim light, notably ferns and mosses. In the total dark the only plants are fungi, and even these are frequently not particularly thrifty.

Animals living in darkness evolve into lean, pallid, almost colorless forms, and are frequently blind or even wholly eyeless, Mr. Barr states; but they tend to compensate for their loss of sight by greater sensitivity to other sensory stimuli.

Mr. Barr's cave studies helped win him a place among the 40 winners of the Eighth Annual Science Talent Search.

Science News Letter, March 12, 1949

ENTOMOLOGY

Mosquito Crosses Bred; May Also Happen in Nature

► HYBRID mosquitoes in nature are the disturbing possibility suggested by success in producing, under laboratory conditions, crosses between the dangerous species that carries yellow fever, *Aedes aegypti*, and a related species, *Aedes albopictus*. The experiments are reported in the journal, SCIENCE (Feb. 25), by Dr. Wilbur D. Downs of the International Health Division of the Rockefeller Foundation and Dr. Rollin H. Baker of the University of Kansas.

Science News Letter, March 12, 1949

PHYSIOLOGY

Applied Air Pressure Sets "Deep Sea" Diving Mark

► WHEN the work piles up and you feel the "pressure" is on, give heed to the feat of Navy Bo's'n Harold Weisbrod of Chicago.

He has just had more pressure on him than anyone in history who lived to tell about it. The literal pressure was turned on in a diving tank at the Naval Gun Factory in Washington.

Although he was only in 10 feet of water, Mr. Weisbrod set a new "deep sea" diving mark. It was done with compressed air on the surface of the water in a diving tank. The pressure put on him was the equivalent of a depth of 561 feet.

The pressure was approximately 265 pounds per square inch, or 18 times normal atmospheric pressure.

Previous depth record was 550 feet, also simulated in a tank. British Navy divers still hold the actual deep diving record which is 536 feet, made in a Scottish lake.

Science News Letter, March 12, 1949

IN SCIENCE

CHEMISTRY

Wool-Like Fiber Made From Cottonseed Protein

► THE cotton plant asserts anew its claim to first honors in clothing mankind. A synthetic wool-like fiber has been added to ages-old cotton cloth and more recent silky synthetics of the rayon family made from acid-treated cotton linters.

The new fiber is made from cottonseed protein, obtained by alkaline extraction after the last of the oil has been removed with solvents. First efforts in this direction were unsuccessful because chemical cross-linkages made its molecules too "lumpy" for good spinning. In the new process, on which U. S. patent 2,462,933 has been granted to a group of four Department of Agriculture scientists, the first alkaline extraction product is modified with acid, resulting in a solution which extrudes and spins well.

Participating in the work, which was done at the Southern Regional Research Laboratory in New Orleans, were J. C. Arthur, Jr., M. L. Karon, A. F. Pomes and A. M. Altschul. Rights in their patent are assigned royalty-free to the government.

Science News Letter, March 12, 1949

ENGINEERING

New Car Air Filter Uses Casein and Wool Fiber

► SURPLUS milk is helping automobile engines. The help comes in a new air filter which uses spun fiber made from casein, a protein of milk. The filters have a chemically treated air-cleaning element, four parts casein fiber and one part wool.

This casein filament-wool fiber mixture has unusual resiliency or "bounce" and seems particularly suitable for bed mattresses and upholstered furniture. The casein fiber is already used in paint and other brushes. The type employed is the result of work at the U. S. Department of Agriculture laboratory at Philadelphia, where an improved method of making the fiber was developed.

Automobile carburetor filters using the filament, made by a firm that produces standard filter equipment, will be ready for the general market in the near future. They are intended to supersede oil-bath air cleaners now used on many cars. The filter is built in a cartridge designed for easy and inexpensive replacement. When the element becomes clogged with dirt the cartridge is discarded and a clean one inserted. The filter fiber is dustless and odorless, and may be colored as desired.

Science News Letter, March 12, 1949

CE FIELDS

MEDICINE

New Sulfa Drug Proves Effective for Ear Disease

➤ NEXT time Junior gets "running ears," the doctor may treat him with Sulfamylon instead of some other sulfa drug or penicillin.

This latest sulfa drug is termed "more effective" than "any other agent now available" for running ears, or chronic otitis media, and also another ear trouble, otitis externa, in a report by Dr. J. W. McLaurin, Baton Rouge, La., to the LARYNGOSCOPE. Dr. McLaurin used the drug in 141 of these ear infections.

Equally enthusiastic reports on the use of the new sulfa drug in other conditions have been made by Dr. Edward L. Howes of Columbia University and Dr. Samuel L. Fox of the University of Maryland to Dr. J. B. Rice of Winthrop-Stearns, New York, who make the drug. Existence of the drug was discovered when captured German soldiers in World War II were found carrying it in powder form for sprinkling on wounds. It will soon be generally available to physicians.

Advantage of the drug emphasized by Dr. Rice is that germs do not become resistant to it.

Science News Letter, March 12, 1949

ARCHAEOLOGY

Life in Old Southwest Modeled by Girl Student

➤ LIFE as it was lived many centuries ago in what is now the American Southwest is portrayed vividly in a diorama of a group of Indians of the long-extinct Basket-Maker Culture, modeled by Vorsila L. Bohrer of Prospect Heights, 18, senior at Arlington Heights Township High School in Arlington Heights, Ill. This diorama, which shows the beginnings of settled village life among the Indians, was exhibited at the Science Talent Institute in Washington. Miss Bohrer was one of 40 winners of the Eighth Annual Science Talent Search.

Miss Bohrer spent two summers in the Southwest, concentrating on Indian archaeology, and especially on the level known as Basket-Maker III. She absorbed all the information she could obtain in museums, from lectures and in consultation with professional archaeologists, before beginning work on her models.

In the group which she has completed, several Indians are shown working on the construction of an earthen house. One woman is shown bringing up earth in a pannier or carrying-basket, while another kneads more earth to the proper consistency in a

mixing-trough and a man plasters it on the stick-and-brush framework of the unfinished dwelling. The Indians wear very little in the way of clothing, but their ornaments of shell and other materials are modeled carefully after originals found in Basket-Maker sites.

Two other women are shown preparing food, with a man at work in a corn-patch behind them, and a naked baby crawling towards its mother. A turkey stretches its neck inquisitively over the corn-basket—perhaps watching for a chance to snatch a grain.

In the background, partly hidden behind a cactus thicket, stands a hunter with spear and spear-thrower. In Basket-Maker times, the Indians had not yet invented the bow, but used a noched stick, called an atlatl by archaeologists, to give their throwing-spears longer range and higher velocity. Within spear-throw sits a jackrabbit, a food animal whose fur was also much used in making blankets.

Miss Bohrer's ambition is to become a full-fledged archaeologist, and to have a part in the further development of our knowledge of prehistoric man in the Southwest.

Science News Letter, March 12, 1949

AERONAUTICS

New Jet Fighter Plane Has Rocket-Assist Engines

➤ A PEPPED-UP version of the Republic Thunderjet, now completing taxi tests in Farmingdale, L. I., is designed as the U. S. Air Force's newest, and perhaps speediest, jet fighter. Rocket power will assist the jet engines for rapid take-offs, climbs and spurts in emergencies.

This plane is what the Air Force calls a high-altitude interceptor fighter to be used as a local defense weapon capable of combating enemy bombers and such missiles as come within its range and capabilities. It is in the 600-mile-per-hour class. It has the general conformation of the Thunderjet, with its air scoop centered on its nose, but differs in several important respects.

A notable feature is its swept-back wings and swept-back tail, adopted to give less drag in the air and thus promote speed. Its thin wings appear to have greater vertical width at the wing tips than at their junction with the fuselage. The wingspan is 30 feet, and the length of the plane is 45 feet. The craft is powered with a turbo-jet engine, but the type is not revealed. Its rocket engines are for assists, not for primary power.

This new plane will make its first flight tests at Muroc Field, Calif., at the Air Force flight test base. Its present designation is the XF-91, the "X" to be removed when it has proven its worth. A distinguishing feature is its landing gear, with tandem-wheels well centered under each wing, and a third wheel well forward under the nose of the fuselage.

Science News Letter, March 12, 1949

PLANT PHYSIOLOGY

Fluorine in Drinking Water Found Harmless to Plants

➤ IF fluorine is being added to the water supply in your town to protect children's teeth against decay, you need not fear to use it in sprinkling your garden or watering your potted plants. Experiments carefully carried out by John D. Kaufman, 16, a high school senior in Grinnell, Ia., have demonstrated that in the concentrations used for decay-preventing purposes, fluorine will not harm young plants.

Mr. Kaufman used soilless gardening methods in making his tests. He planted three bean seeds each in 12 pots filled with the artificial soil known as vermiculite, and watered them with solutions containing chemically active fluorine in eight different dilutions, ranging from one to 1,000 parts per million. Three pots received dilute solutions of common salt (sodium chloride) instead of fluorine, and one pot, used as a control, received distilled water only. It was found that in a concentration between 100 and 500 parts of fluorine per million of water, sprouting was inhibited. This concentration, however, is far above the level commonly used in city water.

In a second experiment, the effects of fluorine on growth rather than on sprouting were investigated. This time the beans were allowed to sprout and grow to a height of two inches before they received water containing any fluorine. The plants were also given the necessary fertilizer elements in solution.

After five weeks, all the plants were still alive. Only those receiving the highest concentration of fluorine, 1,000 parts per million of water, were stunted. Since this concentration is hundreds of times higher than that used in drinking water anywhere, Mr. Kaufman states that "we may conclude that the use of fluorides in drinking water to check tooth decay could have no harmful effect upon the sprouting or the growth of plants."

Mr. Kaufman was one of 40 winners of the Eighth Annual Science Talent Search.

Science News Letter, March 12, 1949

PUBLIC HEALTH

WHO Is Awarded Medal For Fight Against Cholera

➤ A MEDAL has been awarded to the World Health Organization of the United Nations for its first big job of international cooperation against disease.

The medal was awarded to WHO by the Egyptian Government for the international action which stopped a cholera epidemic in that country in 1947. Presentation of the medal on behalf of the Egyptian Government was made in Geneva, Switz., to WHO by WHO's executive board chairman, Sir Aly Tewfikshousha, Pasha.

Science News Letter, March 12, 1949

PHYSICS

Einstein in Simple Terms

The theory of relativity is hard to understand because Einstein's idea is big, not his words. Tribute is paid him this month on his seventieth birthday.

Distinguished scientists are being joined by laymen this year in paying tribute on his seventieth birthday to Albert Einstein, who was born at Ulm, Germany, March 14, 1879. Most of us know that the great mathematician and physicist developed theories which are helping lead the world into an atomic age. But few people dare to pretend they thoroughly understand Einstein. Most of us sometime have appealed to someone to "Explain Einstein's theories in one-syllable words." A quarter-century ago such a plea was answered by the late Dr. Edwin E. Slosson, first director of Science Service.

By the late

Dr. EDWIN E. SLOSSON

Director, Science Service, 1921-29

► A FRIEND OF MINE—I don't know him personally, but any man who buys a book of mine is a friend of mine—writes to me: "If you will put Einstein's theory of relativity in words of one syllable perhaps I can understand it."

Now, that is a foolish notion—even though he is a friend of mine. Short words may be easier to pronounce, but not easier to understand. Some of the most difficult words in the language to grasp or define are monosyllables—for instance, mass, force, law, love, God. Chinese is a monosyllable language, but not easy to learn. Einstein's idea is hard to get, not because he uses big words, but because it is a big idea. Einstein does better than put his theory in words of one syllable. He puts it in symbols of one letter. But even those who understand the algebraic language do not find it easy to follow him.

Besides, how can I be expected to discuss Einstein's theory of relativity in words of one syllable when "Einstein" has two syllables, "theory" three and "relativity" five?

But anything to oblige a friend. So here goes:

On a Train

If you were on a train and saw a train on the side track slip by your pane of glass you could not tell which train moved if yours did not jolt. You might think that your train was at rest, and that one moved back, or that both moved, but not at the same rate or the same way. It would be all the same which way you looked at it.

If now you were in a tight box or chest as big as a room that rests on the ground you would feel a down pull, which we call

your weight. It is said to be due to a "force." But if the box is off in space where there is no force from the earth to act on it, and the box is pulled up by a rope at the same rate as a mass falls to the earth, you would feel the floor press up on your feet just the same as when you stood on the ground.

You know how it feels when you are in a lift that goes up with a jerk. If, while you were in this box off in space, you should throw a ball up in the air, it would go up a ways then fall down to the floor. So it looks to you, though to a man not in the box it seems that the floor moves so fast that it must catch up with the slow ball.

If you should fire a shot straight from the right side of the box to the left, its path would seem curved down at the end as it would on the earth. So, then, a ray of light, which, too, we say moved straight, would seem to you curved when it passed through the box as though it, like the shot, had been pulled down by some force. But there is no down force in this case for the box is not near the earth. It is due to the fact that the box moves up with more and more speed in the same way as a mass falls to the earth.

Ray of Light

Then we must think that a ray of light near a large mass would not move in a straight line but in a curve. It would act just as if there were a force to pull it in. This has been found to be so. As the light from a star goes past the sun its track is bent to the sun as though the sun pulled the ray, as it does the earth in a curved path. So when the sun is made dark by the moon the stars round about it seem pushed out of place. They do not stand so close as they do on the star map when the sun is not in their midst.

Then, too, the sphere that moves round the sun and is most near to it does not quite close up the ring of its path at the end of a year as it should by the old law. The new law shows why this is so.

A third test of the new law is still to be passed. The light and dark lines that are seen in a beam of light when it is bent out of its course by a wedge of glass should be pushed to the red end of the band if the light comes from large stars like the sun. A long light wave like the red should show more shift than the short waves. This point has not yet been proved for sure. Such a shift has been seen, but does not seem to be of the right size.

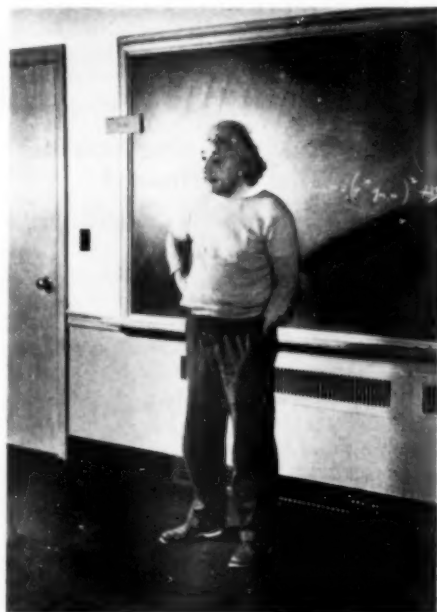
(Note: In the years since Dr. Slosson wrote, the new law was put to this third test and it won out.)

Some strange things must be true if the law holds good. First, we must say that mass and weight are not fixed, but change when the thing moves, though the change is slight save at high speeds. But near the speed of light the change is great. A thing must weigh more when it moves fast. If a rod goes at great speed in the line of its length it will not seem so long as if it were at rest. No mass can be made to move as swift as light.

A clock in a state of rest does not show the same time as a clock that moves at high speed. As it moves fast through space it seems to slow up. A man would not seem to grow old if he could move with the speed of light.

It is a matter of choice if we say that the earth goes round the sun or that the sun goes round the earth. It all lies in the point of view.

If a ring is seen to be one foot through when a rule is laid on it, it will be Pi (3.14159 and so on) times that length round



EINSTEIN IN CLASSROOM—An American citizen, German-born Albert Einstein is now retired after having served as professor of mathematics at the Institute for Advanced Study at Princeton, N. J. The cold formality of his mathematics, however revolutionary, contrasts sharply with the informality of his dress in a classroom picture taken in 1940.

the rim. But if there is a great weight put in the mid point of the ring, then the line round the rim will not be so long as if the space were free. It will be less than Pi times the line that cuts through the ring at its mid point. If a thin steel disk whirls round fast, its rim will seem to shrink like a hot tire on the wheel of a cart.

It seems, then, that the scheme of points and lines that we got from the Greeks, and that is taught in our schools yet, is not quite true when we come to deal with time and space as a whole. Space would be naught if there were no time. Time would be naught if there were no space. The two must join to form a sort of fixed frame or mesh in which all things are set.

At each point, say the point where you stand, four lines cross and lead out straight in the four ways. One line runs up and down, the next runs right and left, the third runs back and forth, and the fourth runs from time past to time to come. To fix a thing we must know its point on the time line as well as its points on the three

space lines. To place an act we must know when as well as where it came to pass.

Mass will warp this mesh of space and time. A mass as it moves forms a sort of a crease or ridge. A mass that is at rest in space, of course, moves on the time line. A mass, as it moves from this point to that must take the track that is most long through the mesh of space and time.

Space as a whole may be closed up in the form of a sphere or roll, and in that sense may be said to have no end, though it may not be so large as we used to think. A ray of light that starts out from the sun may not go on straight for all time, but may not round the sphere of space and come back at the end of a long time to the place it set out from at the first.

All this is not, as you may think, just a new and queer way to look at the world. It can be put to proof to see if it is the true view, and has, as I have said, come out well on such tests.

The great thing is that it starts a new lead for man's thoughts.

Science News Letter, March 12, 1949

NUCLEAR PHYSICS

Carbon 14 Measures Age

► RADIOACTIVE carbon can be used in measuring the age of anything that has been alive within the past 20,000 to 25,000 years, it has been determined in experiments at the Institute for Nuclear Physics on the University of Chicago campus. The work was done by a three-man research team consisting of Drs. W. F. Libby, E. C. Anderson and J. R. Arnold; they report their findings in *SCIENCE* (March 4).

There is a very small concentration of radioactive carbon, of atomic weight 14, in the air at all times. It is believed to be formed by the bombardment of nitrogen atoms by cosmic rays at high altitude. This radioactive carbon enters into the composition of organic compounds, and thus of living things, just like ordinary carbon of atomic weight 12. Like all radioactive elements, carbon 14 decays or disintegrates at a fixed rate; of any given quantity, one-half will have disintegrated at the end of ap-

proximately 5,720 years. This is known as the half-life of the element.

Working with this knowledge as background, the three researchers first measured the radioactive carbon content of samples of wood from all parts of the world and from altitudes ranging from sea level up to the high plateau of Bolivia. The figures for all samples came out fairly uniform, indicating a practically uniform distribution of natural radioactive carbon in the earth's atmosphere.

They next checked their new time-clock by measuring the radioactive carbon content of two samples of wood from ancient Egyptian tombs whose age was known from other data. The age as indicated by the new method came out very close to the known age. The researchers are continuing the job of "calibrating" their new method, and expect before long to try it on some materials of unknown age.

Science News Letter, March 12, 1949

MEDICINE

Cancer Picture Improving

► WITHIN the next five years you can expect to see the cancer picture make a great change for the better. This was the hopeful feeling among authorities at the close of a meeting on cancer, sponsored by the U. S. National Cancer Institute and the American Cancer Society. Here is how some of them saw the situation:

"We now have the tools needed to find out most of the differences between cancer and normal cells." That is Dr. Paul Aebersold,

the Atomic Energy Commission's Isotopes Division Chief at Oak Ridge, Tenn., speaking.

The tools are five kinds of microscopes, four of them relatively new, plus radioactive chemicals which can be used to follow the very fast and complex chemistry in both normal and cancer cells. With these tools, the subtle differences between cancerous and normal cells, Dr. Aebersold believes, can be detected. And he thinks

that from this and the 10 or 15 new leads now available on the cause and treatment of cancer, "real achievements will be made within five to 10 years."

Within five years we should have far better tests for detecting cancer in its earliest stages when there is most hope for curing it. That is the opinion of Dr. J. R. Heller, Jr., Director of the National Cancer Institute. He bases this opinion on the new, expanding program for training scientists who will be able to devise and evaluate new, simple tests for cancer that can be applied routinely to large numbers of people.

Right now twice as many cancer patients could be cured as actually are cured, Dr. Charles Branch of the American College of Surgeons and Dr. Charles S. Cameron of the American Cancer Society agreed. They stated that 80% of all cancers occur at places in the body where they can be found by the practicing physician with methods now available to him in his office. These are cancers of the breast, womb, skin, mouth and lower bowel.

Within five years the death rate from cancer of the breast may be cut in half. It could be done by a very simple measure which the American Cancer Society intends to push, Dr. Cameron said. The method is simply to teach all women over 35 years old to examine their own breasts once every month. The monthly examinations are believed necessary to detect the cancer in its earliest stage. There are not enough physicians to do the job, but "any woman with any intelligence can learn to do it," Dr. Cameron said.

Second new cancer-detecting measure the Society will push is routine chest X-ray examinations of people in the older age groups. From this conference, Dr. Cameron said, it has been learned that this measure will be practical for early detection of the apparently growing numbers of lung cancers. If found early, these cancers can be removed by surgery.

"It will be impossible ever to prevent cancer, or to devise a test that will show that a given person is going to develop it," Dr. E. V. Cowdry of St. Louis declared.

Scientists know about 250 chemicals that will cause it, in addition to almost all physical agents from heat and the sun's ultraviolet rays to atomic radiations. The remarkable thing, Dr. Cowdry points out, is that most of us escape cancer.

"But," he said, "we can learn to detect cancer earlier after it starts."

Science News Letter, March 12, 1949

When boiling peeled *potatoes*, the more water used the more food value lost.

The *wild rushes* seen in tidewater marshes have several valuable uses, including for woven chair seats.

Speed and size of future *planes* must be compromised with the limitations of available passenger loads, safety and navigational problems, and airport facilities.

BIOCHEMISTRY

Enzyme Action in Cancer

► A FURTHER sign that in human cancers there is a fundamental disturbance in enzyme action within the cell has been discovered in studies by Drs. Henry M. Lemon and Charles L. Wiseman, Jr., at Massachusetts Memorial Hospitals and Boston University School of Medicine.

Enzyme chemicals are usually proteins and are responsible for important chemical transformations in living tissues. Pepsin in stomach juice which breaks down food proteins is a familiar example of an enzyme. The one studied by Drs. Lemon and Wiseman is called acid phosphatase.

There is greater activity of this enzyme in cancer cells than in normal cells of the

same kind of tissue or organ, they report in the journal, *SCIENCE* (March 4).

They believe this is the first time this increase in tissue acid phosphatase activity has been reported in human cancers. They suggest this increased activity of the enzyme may be related to the rapidity with which cancerous tissue takes up and holds tagged phosphorus.

The simple techniques for studying the enzyme activity which they report may, they state, help in a more intensive investigation of the quantitative chemical changes within cells which are involved in the transformation of normal tissues to cancers in humans.

Science News Letter, March 12, 1949

AERONAUTICS-ENGINEERING

Liquid Oxygen for Pilots

► OXYGEN in liquid form, instead of as a gas highly compressed in containers, may soon be in use in airplanes flying at high altitudes for pilots, crews and passengers. The advantage is a saving in space and weight, as well as increased safety for flyers.

A new oxygen converter system, now under test at the Wright-Patterson base of the U. S. Air Force in Dayton, O., permits the use of the liquid form of oxygen. Also developed is a mobile oxygen liquefaction plant that can be contained in one trailer-truck. The trailer can be parked on the corner of a flying field, and with a storage tank, will fill the needs of the planes.

The converter consists of a metal container for the liquid oxygen, with a vaporizing coil and the necessary safety valves and specially designed operating valves. The oxygen, upon vaporization, is forced through the distribution system by the pressure formed by the change from a liquid to a gas. This converter is now being tested in a B-17.

The gaseous type of oxygen supply units for the B-17 weigh about 400 pounds when fully charged. The liquid type weighs only 130 pounds. It also saves 80% in space. One cubic foot of liquid oxygen will provide approximately 800 cubic feet of gaseous oxygen upon evaporation.

Although experiments in the use of liquid oxygen for supplying breathing oxygen have been carried on for years by several nations, no satisfactory method of storing and handling the liquid in planes had been found until now. The high pressure that builds up inside a closed tank of liquid oxygen, due to evaporation, precludes the use of tightly closed bottles or tanks. This required the development of methods that would permit controlled evaporation.

Insulation of the small units installed on planes was easily solved by applying the laboratory method of preserving the necessarily low temperature of minus 297 degrees Fahrenheit. It is by the use of vacuum-walled containers. A one-cubic-foot vacuum container holds enough liquid oxygen for the crew of a B-17, an amount comparable with that supplied by the present gaseous system.

Science News Letter, March 12, 1949

WEATHER INSTRUMENTS

Barometers
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SCIENCE ASSOCIATES

401 Terminal Commerce Bldg., Phila. 8, Pa.

AERONAUTICS

Canada Has Produced Her Second Jet Engine

► CANADA now has its second home-developed and home-produced jet engine for airplanes, it was revealed by the Minister of National Defense in Ottawa. Running tests are being made and the engine is said to perform satisfactorily.

The new engine, known as the Orenda, is the largest known to have a comparable stage of development in North America.

It is the axial-flow type, which allows great power to be contained within a slender design. It is being groomed as a possible power unit for a new long-range jet fighter being developed for the Royal Canadian Air Force. Both engine and plane are being produced by A. V. Roe and Company, Toronto.

This larger Orenda engine follows the successful testing of the design and engineering of a smaller jet unit known as the Chinook, which was first tested about a year ago. The Chinook and the Orenda are the first gas-turbine engines ever produced in Canada.

Science News Letter, March 12, 1949

ENGINEERING

Mercury Vapor Is Used in New Turbine-Generator

► MERCURY vapor instead of steam is used to drive a turbine installed in Hartford, Conn. by the Hartford Electric Light Company, it was revealed. It is said to be the first commercial installation of a mercury turbine-generator.

The installation includes a mercury boiler in which this liquid metal, sometimes called quicksilver, is heated into vapor, just as water is heated into steam. The mercury vapor not only will turn the turbine which in turn drives the electric generator, but also will supply extra heat, which will be used to produce steam for other turbine-generators.

The mercury vapor turbine-generator was built by General Electric. Others are under construction for installations in various parts of the country, GE engineers state. This installation is capable of producing 15,000 kilowatts of electricity and also 200,000 pounds of steam at a pressure of 400 pounds per square inch.

Science News Letter, March 12, 1949

Science Service Radio

► LISTEN in to a discussion on "Drugs of the Future" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST, Saturday, March 19. Dr. Theodore Klumpp, president of Winthrop-Stearns, Inc. and speaking as president of the American Pharmaceutical Association, will be the guest of Watson Davis, director of Science Service. Dr. Klumpp will predict what kinds of drugs are needed in the future and perhaps do a brief and overall summary of the great advances in therapeutic drugs that have been made in recent years. He will also discuss the use of older people in industry, for he believes not only must we have the drugs to be used by physicians in keeping people healthy, but we must do something in this world to utilize the abilities and the real value in our civilization of the older people.

Science News Letter, March 12, 1949



New RCA 16-inch direct-view television tube fills gap between popular 10-inch tubes and the projection-type receivers.

"Inside story" of a bigger, brighter picture on your television screen

The screen on which you are accustomed to seeing television is the face of an electron tube—on which electrons "paint" pictures in motion.

And the size of the picture, unless projected, is determined by the size of the tube.

Working to give you *bigger, brighter* pictures, RCA engineers and scientists developed a new way to make large, direct-view television tubes. They found a

method of "welding" large areas of glass and metal... while keeping a vacuum-tight seal!

Using this development—ideally suited to mass production—RCA can now build television tubes of light, tough metal... using polished glass for the face, or "screen."

An achievement of research

Development of this new television tube is a continuation of basic television research which

began at RCA Laboratories. Such leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

• • •

Examples of the newest advances in radio, television, and electronics—in action—may be seen at RCA Exhibition Hall, 36 West 49th Street, New York. Admission is free. Radio Corporation of America, Radio City, New York 20.



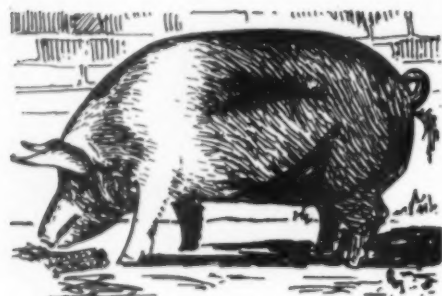
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ZOOLOGY

NATURE RAMBLINGS

by Frank Thone



St. Patrick's Pets

► PREPARATIONS for St. Patrick's Day festivities almost inevitably feature, amid the verdant shamrocks, a plump pink pig, perhaps with a green ribbon tied around his neck. But if mention is made of this incredibly well-scrubbed little porker he is usually referred to as "Paddy's Pig," the implication being that he is the property of some later, humbler namesake of the great saint, as if it were somehow improper to

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by Sol T. De Lee, M.D.

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associate swine with the austere, white-bearded bishop that is the usual picture of St. Patrick.

We should remember, however, that there was a time in Patrick's life when he wore neither beard nor mitre—though he may have had to live austere enough even then. And in those days, if the story of his early life as commonly told has any truth in it, he had a good deal to do with pigs. The tale that as a lad he was kidnapped by pirates and sold into bondage in Ireland, serving some years as a swineherd, is at least as credible as any other part of the Patrician legend.

It may even help explain the near-miraculous strength and energy which he brought to his incessant travels and hard labors throughout a long life. For herding swine in the Irish woods a millennium and a half years ago was no job for a milksop.

The pigs of Patrick's day were slab-sided, fleet-footed, thoroughly "ornery" creatures, more like our Arkansas razorbacks than the tame, sleek, slow-moving porkers of present-day pigpens. Keeping them from straying was a job for a young athlete. If the younger Patrick really ever was a swineherd he got the full benefits of rugged outdoor living and plenty of hard exercise.

Not that St. Patrick would disapprove the kind of pigs they raise in Ireland nowadays, if he should chance to stroll through a county fair in his beloved island. For like most saints (especially those burdened with bishoprics), Patrick was a practical man, desiring to see his people prosperous as well as virtuous; and the modern pig, yielding fuller-fleshed hams and longer rashers of meatier bacon, would undoubtedly please his judicious eye.

Science News Letter, March 12, 1949

CHEMICAL ENGINEERING

Silica-Magnesia Catalyst

► HIGHER gasoline yields, lower butane and gas yields, and somewhat lower gasoline octane numbers have been obtained during a six-months period with a silica-magnesia cracking catalyst as compared with the older silica-alumina material, the American Institute of Chemical Engineers, meeting in Los Angeles, was told by A. L. Conn, W. F. Meehan and R. E. Shanklin, all of the Indiana Standard Oil Company, Whiting, Ind.

The continuing and successful operation with the silica-magnesia catalyst has been characterized by an unusually low rate of activity decline, and by immunity to sulfur poisoning, they stated. It was also found that intentional buildup of carbon on the catalyst is very effective in controlling the activity in the cracking step without the adverse effects of high catalyst losses, flue gas after-burning, and uncontrolled coke buildups experienced with other commercial catalysts.

As the catalyst aged, there was indication of a trend toward lower carbon burning rates. It appears, they declared, that silica-magnesia will have a definite place in the catalytic cracking picture, although conclusions regarding its long range position must await commercial operation over a more extended period.

With more fluid catalytic cracking plants going into operation, the effect of reactor temperature on product distribution and product quality is becoming increasingly important in the refinery process, the chemists were told at the same meeting by C. R. Olsen and M. J. Sterba of the Universal Oil Products Company, Chicago.

Tests at various temperatures were described by them. The general effect of increasing reactor temperature at a given conversion, they stated, is to produce less catalyst deposit and greater quantities of

light hydrocarbon fractions having higher olefin contents. The liquid products contain higher concentrations of unsaturated components, and the clear octane number of the gasoline is increased.

Science News Letter, March 12, 1949

CHEMISTRY

Cancer-Causing Chemical Available in Tracer Form

► ONE of the most potent of cancer-causing chemicals is now available in radioactive tracer form, for research purposes. Synthesis of 2-acetylaminofluorene, in which one of the carbon atoms is the radioactive C-14 isotope, is announced in the journal, SCIENCE (Feb. 25), by Drs. Francis E. Ray and C. Robert Geiser of the University of Cincinnati's laboratory of radiochemistry.

Science News Letter, March 12, 1949

Words in Science— TRANSDUCER

► INSPECTION of metal castings or parts by high frequency sound waves is made possible by a transducer, pronounced "trans-dooos-er," with the stress on "dooos."

The transducer is a device for converting electrical energy into pressure waves, such as sound waves, and for converting the returned sound waves into electricity. The method works like radar, sending back echoes from any flaw in the metal being tested, the sound waves being then turned back into electric energy and recorded.

Science News Letter, March 12, 1949

Books of the Week

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ADOLESCENT CHARACTER AND PERSONALITY—

Robert J. Havighurst and Hilda Taba—*Wiley*, 315 p., illus., \$4.00. A study of boys and girls in a midwest city with 10,000 population. Reputations were studied and interviews and various test methods were included.

AGRICULTURAL GEOGRAPHY OF EUROPE AND THE

NEAR EAST—Lois B. Bacon and others—*Govt. Printing Office*, Misc. Publ. 665, 67 p., illus., paper, \$1.00. Information on the vital questions of soils, crops, and population in Europe and the Near East.

CHILD'S GARDEN OF FLOWERS—Robert V. Mas-

ters—*Greenberg*, 32 p., illus., \$1.00. A cute book for children containing full directions for planting and growing the first flower garden. Contains the seeds needed.

CHILD'S GARDEN OF VEGETABLES—Robert V. Mas-

ters—*Greenberg*, 32 p., illus., \$1.00. With this little book even the very young members of the family can grow attractive vegetables for the table. All instructions are clearly presented and seeds needed are included.

HOW TO KNOW THE BIRDS: A Simple Aid to

Bird Recognition—Roger Tory Peterson—*New Am. Lib.*, 144 p., illus., 35 cents. An outstanding authority provides a pocket size aid to recognizing birds you meet. Contains silhouettes for identifying birds in flight or perched overhead.

HYBRID POPLAR PLANTING IN THE LAKE STATES

—Paul O. Rudolf—*Lake States Forest Experiment Station*, 17 p., paper, free upon request to publisher, University Farm, St. Paul 1, Minn. Report on a very fast growing tree

valuable for pulpwood production.

IDEOLOGICAL DIFFERENCES AND WORLD ORDER—

F. S. C. Northrop, Ed.—*Yale University Press*, 486 p., \$4.50. Pointing out the obstacles which make it difficult to bring international disputes under the rule of law rather than decision by force and suggesting methods for the removal of the obstacles. Contains contributions by a number of different experts in various fields of law and social science.

HUMANISM AS A PHILOSOPHY—Corliss Lamont

—*Philosophical Library*, 368 p., \$3.75. An expansion and revision of a lecture course "The Philosophy of Naturalistic Humanism" given by the author at Columbia for the past three years.

THE RADIO AMATEUR'S HANDBOOK—Amer.

Radio, 26th ed., 564 p., illus., paper, \$2.00. Contains an immense amount of technical information for the "ham."

SOCIAL WORK YEAR BOOK 1949—Margaret B.

Hodges, Ed.—*Russell Sage*, 10th issue, 714 p., \$4.50. 1949 edition of a book published biennially as a concise encyclopedia of organized activities of social work and related fields.

THESE BEAR THE TORCH: Five years of progress

in mental hygiene—*New York Department of Mental Hygiene*, 48 p., illus., paper, free upon request to publisher, Governor Alfred A. Smith State Office Building, Albany 1, New York. An interesting report on how New York state cares for the mentally ill and mentally handicapped.

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cussed by the scientist. Pre-recording of sound was one suggested.

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GENERAL SCIENCE

New Council To Iron Out World Meeting Conflicts

➤ TO PREVENT conflicts in world meetings on medicine, 54 international associations, leagues, committees and congresses are joining in a new super-international council.

A meeting at Brussels, April 4 to 9, will discuss methods of preventing meetings being held at the same time or in widely spaced geographical locations. One plan will be to encourage serial meetings in the same part of the world. Both UNESCO and the World Health Organization are encouraging this new attempt to exchange information and cooperate in the many world fields of medical science and pure and applied biology.

Prof. J. Maisin, general secretary of the International Union Against Cancer, will be chairman of the new coordination committee, while arrangements for the meeting are being made by Dr. I. M. Zhukova, head of the medical sciences division of the United Nations Educational, Scientific and Cultural Organization in Paris.

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RADIO

Ghosts In Radio Reception

➤ ELIMINATING "ghosts" from television reception is one of the problems confronting the radio engineers. They come from what scientists call two-path transmission caused by reflections from buildings and other objects.

In shortwave AM broadcasting, the type picked up by ordinary radio receivers, the same phenomenon caused by multiple reflection from the radio-reflecting strata high in the air, known as the ionosphere, frequently results in severe distortion.

One of the important characteristics of a modulated system of broadcasting is the possibility of interference, the Institute of Radio Engineers meeting in New York, was told by Ernest R. Kretzmer of the Massachusetts Institute of Technology. While one system may be adversely affected by common-channel interference from a similar communication service, another system may not suffer noticeably even though the interfering signal is equally strong.

Pulse-time modulation was the particular type discussed by Prof. Kretzmer. This is the generic term, he explained, for those

types of pulse modulation in which the timing of pulse edges is varied in accordance with the modulating signal. They are of two types, pulse-duration modulation (PDM) and pulse-position modulation (PPM). They differ essentially only in the relation between the timing of the two low edges of each pulse.

The main difference between the sound technique of a television studio and that of sound broadcasting and motion picture recording was presented to the meeting by Robert H. Tanner, Northern Electric Co., Ltd., Belleville, Ontario. In sound broadcasting, the microphone is all-important, whereas in television and motion pictures it has to compete with cameras and lights.

Television studios cannot be provided in such numbers or in such variety as broadcasting studios. The microphones will always be farther away from the artist than in sound broadcasting, and the noise level in the television studio will always be higher. Frequent changes in camera angles require corresponding changes in sound. Methods for combatting these difficulties was dis-

A New Theory of HUMAN EVOLUTION

By SIR ARTHUR KEITH

EVER since man's kinship with the apes was recognized, there has been controversy over the nature and habitat of his pre-human ancestors and the causes which led to their evolution into *homo sapiens*. Now Sir Arthur Keith, in a book finished, as he tells us, on his eighty-first birthday, gives us the results of his years' study of these questions.

It was formerly held that man was actually descended from apes of the existing species, the European perhaps from the chimpanzee, the Negro from the gorilla and the Mongol from the orang-outang. Of late years, however, it has come to be the general opinion among anthropologists that man is not descended from any existing anthropoid but from some now extinct relative; and the fact that all races of mankind will readily interbreed has been taken to show that the human species is really one, and must therefore be the offspring, if not of one pair, at least of one related group. \$4.75

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• New Machines and Gadgets •

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❁ **COLLAPSIBLE** baby carriage has a detachable bassinet, made of resin-bonded light wood fiber, which can be used as a baby basket in the home or in the car. The chassis folds to occupy a minimum of space in storage, and can be converted into a stroller when carriage days are over.

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❁ **OUTBOARD MOTOR SHIFT**, which operates by varying the pitch of the propeller, can be easily attached to nearly all standard outboard motors and permits either two or three forward speeds, in addition to neutral and reverse. In neutral, the propeller is feathered, which permits warming the motor while standing.

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❁ **MICROFILM READER**, motor-driven at three speeds and with variable magnification of 24 to 35 diameters, resembles a two-drawer letter file in height and appearance, but the turret top screen revolves through 360 degrees to bring the film into direct view of the user. New optical flats, which hold the film in focus while moving, prevent dust scratches.

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❁ **CLEAVER** for the kitchen, shown in the picture, may be used not only for chopping meat and vegetables but also to tenderize steak, open bottles, grip one-inch standard metal screw caps, lift tacks and nails, and wedge open stuck refrigerator



trays. It is made of highly tempered carbon steel.

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❁ **SMALL-SIZE** electric transformer, for insertion in a line to an extension trouble lamp, cuts current voltage from 110 to six volts, providing safety from shock to the light user. The four-pound transformer, which looks like a large black capsule, is in a strong plastic housing to permit dragging around.

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❁ **PICK-UP STICK**, for a wheel chair patient, or usable as a cane, has a magnet at one end and a detachable hook at the other. The magnet can pick up a needle or thimble from the floor and the special hook can pick up any tool with a proper hole in it, or a handkerchief or a letter.

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❁ **MIST SPRAYER**, light enough to be used in the ordinary truck, has a vertical range of 65 feet and a horizontal range of over 700 feet. It is designed for use in controlling insects and fungi on shade and orchard trees but can also be used in mosquito and fly elimination programs.

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❁ **MIDGET FAN**, weighing only three pounds and taking less than 10 inches of space in a travelling bag, is a hot-weather electrical accessory designed to provide comfort for travellers. It is claimed to be as efficient as the non-portable table model fan.

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Do You Know?

On a single acre of good soil, some 1,500 pounds of *sunflower seed* can be grown, from which about 400 pounds of table oil can be extracted.

Three species of coffee are grown commercially but what scientists call *Coffea arabica* accounts for 90% of all coffee consumed.

Quartz, virtually insoluble in water ordinarily, can be made as soluble as common salt by putting crushed quartz with a trace of caustic soda in water and heating to 700 degrees Fahrenheit at 15,000 pounds per square inch pressure.

Both balloons and rockets are contributing to man's knowledge of conditions in upper spaces many miles above the earth; balloons carry self-recording instruments to nearly 20 miles, while rockets take them into the 70-mile region.

Hybrid trees, from a combination of the eastern and the western white pine, are expected to mature in from 30 to 40 years less time than the parent trees require.

Albino rats, in a laboratory experiment, developed goiters when a little photographer's hypo, chemically sodium thiosulfate, was added to their drinking water.

Low-pressure laminating is the technique employed in producing strong, curved molded parts with plastic resins and fabric fillers; the mixture, placed in a mold or over a form, is sometimes pressurized by air in a rubber bag.

In the *photoelectric cell*, the so-called electric eye, variations in the light hitting it cause corresponding variations in the electric current flowing through it; in the *photovoltaic cell*, light energy is converted to electric current.

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